

# DENİZ BILMAN — CV

Department of Mathematical Sciences  
University of Cincinnati  
2925 Campus Green Dr, Cincinnati, OH 45221

🏠 <http://homepages.uc.edu/~bilman>  
✉ [bilman@uc.edu](mailto:bilman@uc.edu)  
📱 [denizbilman](#)

## RESEARCH INTERESTS

Nonlinear waves, integrable systems and their perturbations, Riemann-Hilbert problems, dispersive PDEs

## APPOINTMENTS

**University of Cincinnati**, Department of Mathematical Sciences  
Assistant Professor 08/2019–present

**University of Michigan**, Department of Mathematics  
Postdoctoral Assistant Professor. Research mentor: Peter D. Miller 09/2015–08/2019

## EDUCATION AND TRAINING

**University of Illinois at Chicago**  
Ph.D. in Mathematics. Thesis advisor: Irina Nenciu 08/2015  
Thesis title: *On Long-Time Asymptotics for the Toda Lattice and Its Hamiltonian Perturbations*

**Boğaziçi University**, Istanbul, Turkey  
B.S. & M.S. in Mathematics. M.S. Thesis advisors: O. Alp Eden and T. Burak Gürel 06/2009  
M.S. Thesis title: *On Special Solutions of the Zakharov-Schulman System*

## ARTICLES IN PREPARATION

- D. Bilman and R. Jenkins. Large-time development of initial data with spectral singularities
- D. Bilman and T. Trogdon. On numerical inverse scattering for the Korteweg-de Vries equation with discontinuous step-like data II: Large-time
- D. Bilman. A special solution of the nonlinear Schrödinger equation: Rogue wave of infinite order
- D. Bilman, L. Ling, P. D. Miller, and A. Tovbis. High-order fundamental rogue waves in the far-field limit

## SUBMITTED OR ACCEPTED PUBLICATIONS

- D. Bilman, R. Buckingham, and D. Wang, “Far-field asymptotics for multiple-pole solitons in the large-order limit,” *preprint*, 2019.  
[arXiv:1911.04327](#), 38 pages
- D. Bilman and T. Trogdon, “On numerical inverse scattering for the Korteweg-de Vries equation with discontinuous step-like data,” **Nonlinearity**, 33 no. 5, 2211–2269, 2020.  
[DOI:10.1088/1361-6544/ab6c37](#), 59 pages
- D. Bilman and R. Buckingham, “Large-order asymptotics for multiple-pole solitons of the focusing nonlinear Schrödinger equation,” **Journal of Nonlinear Science**, 29 no. 5, 2185–2229, 2019.  
[DOI:10.1007/s00332-019-09542-7](#), 45 pages
- D. Bilman, L. Ling and P. D. Miller, “Extreme superposition: rogue waves of infinite order and the Painlevé-III hierarchy,” **Duke Mathematical Journal**, 169 no. 4, 671–760, 2020.  
[DOI:10.1215/00127094-2019-0066](#), 90 pages
- D. Bilman and P. D. Miller, “A robust inverse scattering transform for the focusing nonlinear Schrödinger equation,” **Communications on Pure and Applied Mathematics**, 72 no. 8, 1722–1805, 2019.  
[DOI:10.1002/cpa.21819](#), 84 pages
- D. Bilman and T. Trogdon, “Benchmarking numerical methods for lattice equations with the Toda lattice,” **Applied Numerical Mathematics**, 141, 19–35, 2017.  
[DOI:10.1016/j.apnum.2018.09.020](#), 16 pages

- D. Bilman and S. Konstantinou-Rizos, “Discrete integrable systems, Darboux transformations, and Yang-Baxter maps,” *Symmetries and Integrability of Difference Equations*, **CRM Series in Mathematical Physics**, Springer, 2017. DOI:10.1007/978-3-319-56666-5\_5, 54 pages
- D. Bilman and T. Trogdon, “Numerical inverse scattering for the Toda lattice,” **Communications in Mathematical Physics**, **352** no. 2, 805–879, 2017. DOI:110.1007/s00220-016-2819-0, 75 pages
- D. Bilman and I. Nenciu, “On the evolution of scattering data under perturbations of the Toda lattice.” **Physica D**, **330**, 1–16, 2016. DOI:10.1016/j.physd.2016.03.017, 16 pages

## AWARDS, GRANTS, AND HONORS

- Taft Faculty Summer Research Fellowship (\$8,000), University of Cincinnati, Summer 2020
- Honored Instructor Award, University Michigan, 2019  
*Nominated and chosen by students “for having an impact on their lives and academic careers.”*
- AMS-Simons Travel Grant (\$4,000), 2017–2019
- The B. Alan Taylor Award, University of Michigan, 2017  
*Given by the Department of Mathematics “for excellence in teaching, mentoring, and research.”*
- Early Career Travel Award, SIAM, 2015  
*Given by SIAM to attend the SIAM OPSFA International Symposium.*
- Graduate Research Scholarship, The Scientific and Technological Research Council of Turkey, 2007–2009
- Best Diploma Thesis Recognition, Department of Mathematics, Boğaziçi University, 2007

## SOFTWARE

Contributor of the ISTPackage, since 2015. <https://bitbucket.org/trogdon/istpackage>

## STUDENT MENTORING

Xiaoen Zhang, graduate student co-mentored with Peter D. Miller, University of Michigan, 2018–2019.

## PRESENTATIONS

37. The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Atlanta, GA, June 5–9, 2020 — *Postponed due to the COVID-19 Pandemic.*
36. SIAM Nonlinear Waves and Coherent Structures, Bremen, Germany, July 27–30, 2020 — *Cancelled due to the COVID-19 Pandemic.*
35. Analysis Seminar, University of Cincinnati, February 12, 2020
34. The Nonlinear Dispersive Partial Differential Equations and Inverse Scattering Workshop, Fields Institute, Toronto, Canada, May 21–25, 2019
33. 11th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena, Special Session on Nonlinear Waves, Athens, GA, April 17–21, 2019
32. Departmental Seminar, Colorado State University, April 1, 2019
31. Departmental Colloquium, DePaul University, January 29, 2019
30. Departmental Colloquium, University of Cincinnati, January 24, 2019
29. Integrable Systems and Random Matrix Theory Seminar, University of Michigan, November 19, 2018
28. Applied Mathematics Seminar, University of Washington, November 8, 2018
27. The 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Taipei, Taiwan, July 5–9, 2018
26. Analysis and PDE Seminar, University of Kentucky, April 2, 2018
25. Departmental Colloquium, University of Wyoming, March 2018
24. Departmental Colloquium, Bucknell University, March 2018
23. Departmental Colloquium, Wake Forest University, February 2018
22. Analysis Seminar, University of Virginia Commonwealth, December 1, 2017
21. Applied and Interdisciplinary Mathematics Seminar, University of Michigan, September 29, 2017
20. 79/80th Anniversary Midwest PDE Seminar, University of Illinois at Chicago, September 14–17, 2017

19. Focus Program on Nonlinear Dispersive Partial Differential Equations and Inverse Scattering, Fields Institute, Toronto, Canada, August 1–18, 2017
18. Tenth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena, Special Session on Asymptotics and Applied Analysis, Athens, GA, March 29–April 1, 2017
17. Applied and Computational Mathematics Seminar, UC Irvine, LA, November 7, 2016
16. Integrable Systems and Random Matrix Theory Seminar, University of Michigan, October 2016
15. AMS Fall Sectional Meeting, Special Session on Geometric Flows, Integrable Systems and Moving Frames, University of St. Thomas, October 28, 2016
14. *Series of lectures* at the Abecedarian of Symmetries and Integrability of Difference Equations Summer School, Université de Montréal, Montréal, Québec, Canada, July 2016
13. International Conference on Nonlinear Waves: Theory and Applications, Tsinghua University, Beijing, China, June 2016
12. 13th SIAM International Symposium on Orthogonal Polynomials, Special Functions and Applications (SIAM-OPSFA), National Institute for Standards and Technology, Gaithersburg, MD, June 2015
11. Chicago Area SIAM Student Conference, Illinois Institute of Technology, Chicago, April 2015
10. AMS Spring Sectional Meeting, East Lansing, MI, March 2015
9. Graduate Analysis Seminar, University of Illinois at Chicago, Chicago, November 2014
8. Partial Differential Equations Seminar, Drexel University, October 2014
7. AMS Fall Sectional Meeting, San Francisco, CA, October 2014
6. Recent Advances in PDEs and Fluids Workshop, Stanford University, August 2013
5. CNA Summer School: Topics in Nonlinear PDEs and Calculus of Variations, and Applications in Materials Science, Carnegie Mellon University, May 2013
4. Graduate Student Colloquium, University of Illinois at Chicago, March 2013
3. Partial Differential Equations Seminar, University of Illinois at Chicago, September 2012
2. Annual SIAM Chapter Meeting, University of Illinois at Chicago, April 2012
1. 69th Midwest PDEs Conference, University of Illinois at Chicago, April 2012

## OUTREACH AND EXPOSITORY LECTURES

*What Are Solitons?*, Lecture in the Undergraduate Math Club, University of Michigan, Fall 2016

## PEER REVIEW

Communications in Mathematical Physics  
 Studies in Applied Mathematics  
 Nonlinearity  
 Physica D  
 Journal of Computational Physics  
 SIAM Journal of Mathematical Analysis  
 European Journal of Physics Plus  
 Zeitschrift für Angewandte Mathematik und Physik (ZAMP)  
 AMS Mathematical Reviews (4 articles, 1 book)

## DEPARTMENTAL SERVICE

### **University of Cincinnati**

Partial Differential Equations Doctoral Exam Committee, 2019–2020

### **University of Michigan**

Development of MATH 215 - Calculus 3 lab-work, 2017 and 2018

### **University of Illinois at Chicago**

Graduate Student Mentor, 2014–2015

Member of the Graduate Mentoring Award Committee, 2012–2013

President of the SIAM Student Chapter, 2012–2013

Teaching Assistant Coordinator, 2012–2013

### **Boğaziçi University**

Teaching Assistant Coordinator, 2008–2009

## MEMBERSHIP IN PROFESSIONAL SOCIETIES

Member of American Mathematical Society (AMS)

Member of Society of Industrial and Applied Mathematics (SIAM)

- Member of the SIAM Activity Group on Nonlinear Waves and Coherent Structures
- Member of the SIAM Activity Group on Analysis of Partial Differential Equations
- Member of the SIAM Activity Group on Orthogonal Polynomials and Special Functions

## CONFERENCE AND SYMPOSIA ORGANIZATION

*Co-organizer*, Special Session in the AMS Fall Sect. Meeting, Ann Arbor, MI

October 2018

*Organizing Chair*, **Inaugural** Chicago Area SIAM Students Conference, Chicago, IL

April 2013

*Co-organizer*, 8th Nonlinear Dispersive PDE Conference, IMDB, Istanbul, Turkey

August 2008

## TEACHING

### University of Cincinnati

Partial Differential Equations (MATH 7006), 1 section - *Instructor*

Spring 2020

Calculus I (MATH 1061), 1 section - *Instructor*

Spring 2020

Calculus II (MATH 1062), 1 section - *Instructor*

Fall 2019

### University of Michigan

Intr. Numerical Methods (MATH 471), 1 section - *Instructor*

Summer 2019

Boundary Value Problems (MATH 454), 1 section - *Instructor*

Spring 2019

Intr. Numerical Methods (MATH 471), 2 sections - *Instructor*

Winter 2019

Honors Calculus I (MATH 185), 2 sections - *Instructor*

Fall 2018

Intr. to Differential Equations (MATH 216), 1 sections - *Instructor*

Spring 2018

Intr. to Differential Equations (MATH 216), 2 sections - *Instructor*

Winter 2018

Intr. to Differential Equations (MATH 216), 2 sections - *Instructor*

Fall 2017

Intr. to Differential Equations (MATH 216), 1 section - *Instructor*

Winter 2017

Calculus I (MATH 115), 2 sections - *Instructor*

Fall 2016

Calculus III (MATH 215), 2 sections - *Instructor*

Winter 2016

Calculus I (MATH 115), 2 sections - *Instructor*

Fall 2015

### University of Illinois at Chicago

Emerging Scholars Workshop for Calculus I - *Instructor*

Spring 2015

Research Assistantship (no teaching)

2012–2015

Precalculus (MATH 121) - *Teaching Assistant*

Spring 2012

Calculus I (MATH 180) - *Teaching Assistant*

Fall 2011

Intermediate Algebra Summer Enrichment Workshop (MATH 090 SEW) - *Instructor*

Summer 2011

Intermediate Algebra (MATH 090) - *Teaching Assistant*

Spring 2011

Precalculus (MATH 121) - *Teaching Assistant*

Spring 2010

Beginning Algebra (MATH 075) - *Teaching Assistant*

Fall 2009

### Boğaziçi University, Istanbul, Turkey

Calculus I (MATH 101) - *Teaching Assistant*

Summer 2009

Abstract Linear Algebra (MATH 224) - *Teaching Assistant*

Spring 2009

Complex Analysis (MATH 232) - *Teaching Assistant*

Fall 2008

Calculus II (MATH 102) - *Teaching Assistant*

Spring 2008

Matrix Theory (MATH 201) - *Teaching Assistant*

Fall 2007

## SCHOOLS AND WORKSHOPS PARTICIPATED

12. Dispersive Hydrodynamics, Isaac Newton Institute, Cambridge, UK, July 06–26, 2020

11. The Nonlinear Dispersive Partial Differential Equations and Inverse Scattering Workshop, Fields Institute, Toronto, Canada, May 21–25, 2019

10. NSF-CBMS Workshop on Solving Problems in Multiply Connected Domains, Irvine, CA, June 2018

9. Focus Program on Nonlinear Dispersive Partial Differential Equations and Inverse Scattering, Toronto, Canada, August 2017
8. BIRS-CMO Workshop: Geometrical Methods, Non-Self-Adjoint Spectral Problems, and Stability of Periodic Structures, Oaxaca, Mexico, June 2017
7. The Abecedarian of Symmetries and Integrability of Difference Equations Summer School, Université de Montréal, Montréal, Québec, Canada, July 2016
6. Summer School on Random Matrices, University of Michigan, Ann Arbor, MI, June 2016
5. Summer School on Stochastic Analysis and Geometry, University of Illinois at Chicago, Chicago, IL, August 2014
4. Scattering and Inverse Scattering in Multidimensions, University of Kentucky, Lexington, KY, May 2014
3. Recent Advances in PDEs and Fluids Summer School and Workshop, Stanford University, Palo Alto, CA, August 2013
2. CNA Summer School: Topics in Nonlinear PDEs and Calculus of Variations, and Applications in Materials Science, Carnegie Mellon University, Pittsburgh, PA, May 2013
1. Madison Autumn Analysis and PDE Workshop, University of Wisconsin-Madison, Madison, WI, November 2012

#### MISCELLANEOUS RESEARCH EXPERIENCE

**National Center for Data Mining**, Chicago, IL

Spring 2010

Built a cloud based software for analyzing large genomics datasets and clustering gene candidates based on their protein expression level data

Project Director: Robert L. Grossman

#### COMPUTER SKILLS

C, C++, Python, Julia, Mathematica, Matlab, Supercomputing (MPI/OpenMP)